
Douglas County Community Development
1594 Esmeralda Avenue
P.O. Box 218
Minden, Nevada 89423

Building Division 775-782-6224
Engineering Division 775-782-6235
Planning Division 775-782-6217
Fax: 775-782-9007



Electrical Requirements for Agricultural Buildings

(2005 National Electrical Code Article 547)

Agricultural buildings by their very nature generate dust and corrosive vapors. Storage and use of grains, along with other livestock feeds create dust hazards that may cause electrical fires. Animal wastes from the livestock housed within these types of structures generate corrosive vapors, which may attack electrical equipment and components. The purpose of these electrical requirements is to minimize the hazards associated with these types of structures. They pertain specifically to "agricultural buildings" and those areas defined specifically for agricultural use within a structure.

Below is an abbreviated list of the wiring requirements for agricultural buildings; however, you are still bound to the complete 2005 National Electrical Code.

1. APPROVED WIRING METHODS (2005 NEC 547.5(A)):

- Type UF Cable
- Type SE Cable with Copper Conductors only
- Type NM-C Cable (NOTE: Not residential Type NM-B "Romex" Cable)
- RNC (Rigid Nonmetallic Conduit) – "Gray Electrical PVC" with approved fittings (Sch 80, may be required depending on level of physical protection needed)
- LFNC (Liquid-tight Flexible Nonmetallic Conduit) – This product is sometimes referred to as "Nonmetallic Seal-tight" in the electrical trade.

NOTE: 1) Cables shall be secured within 8 inches of each cabinet, box or fittings. The ¼ inch air space behind mounted nonmetallic boxes, fittings, conduit and cables in NEC 300.6(C) is not required per NEC 547.4.

- 2) EMT, IMC or RMC with compression fittings may be used in areas of the building NOT exposed to corrosive vapors generated by livestock. HOWEVER, in specific areas around or above livestock pens, the required non-metallic raceways SHALL be used. If in doubt, consult with the Building Division prior to installing raceways.

2. PROTECTION OF ELECTRICAL EQUIPMENT (2005 NEC 547.4, 547.5, 547.6 & 547.7):

- All electrical wiring and equipment shall have physical protection
- All switches, receptacle outlets, circuit breakers, controllers and fuses located within the building shall have enclosures that are dust proof and weather proof.
- Parts of the building containing livestock shall be considered a corrosive environment, and electrical equipment shall be of a type capable of withstanding this environment. Douglas County requires the use of nonmetallic materials; however, we do recognize the use of "bell" style boxes, OR electrical boxes approved for a "wet" environment and

without exterior holes that might allow dust or moisture to contact any electrical wiring or equipment.

- Light fixtures shall be of the types that minimize the entrance of dust, water, and affords physical protection to the lamps (In areas where physical damage is deemed likely by the Building Inspector, a guard shall be installed).
- Electrical motors or machinery shall be totally enclosed to minimize the entrance of dust, moisture and corrosive particles.

3. INTERIOR & EXTERIOR RECEPTACLE OUTLETS (2005 NEC 547.5(G)):

- All receptacle outlets shall be Ground Fault Circuit Interrupted (GFCI) protected

4. BONDING REQUIREMENTS SPECIFIC TO AGRICULTURAL BUILDINGS (2005 NEC 547.9 & 547.10):

- Buildings housing livestock, and supplied by an underground feeder circuit shall have a copper Equipment Ground Conductor (EGC) when ran with the ungrounded (hot) conductors and grounded ("neutral") conductors.
- Wire-mesh or any metallic reinforcement used in the floor of the building shall be bonded back to building grounding electrode system by a minimum of #8 AWG copper conductor. This is mandatory for buildings housing livestock on concrete floors.
- Metallic structural members shall also be bonded back to building grounding electrode system by a minimum of #8 AWG copper conductor. The bonding jumper shall be sized accordingly to 2002 NEC Table 250.66. (See also, 2002 NEC 250.104 (C) for structural steel bonding)

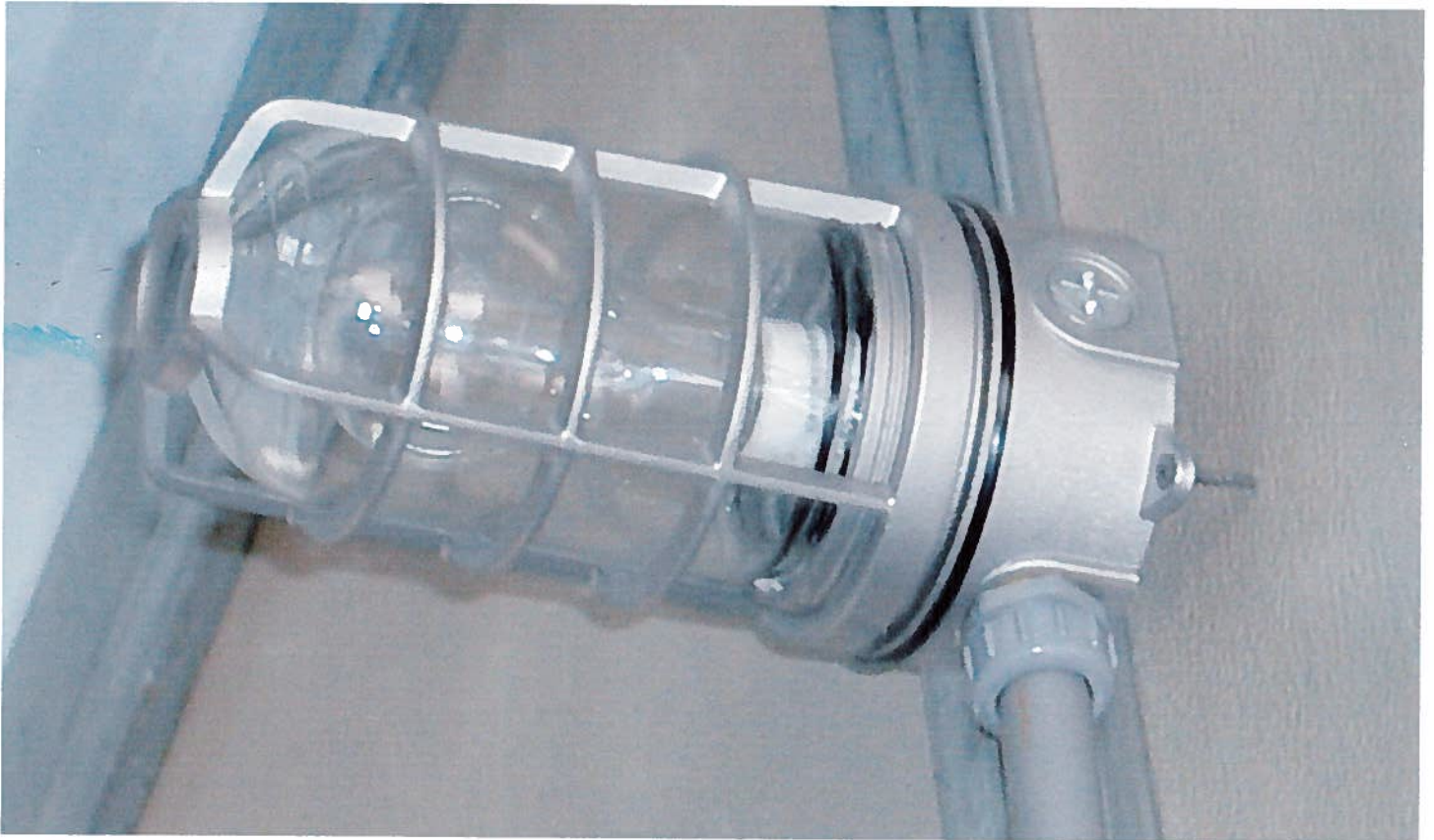
CONCLUSION:

The NEC encourages the designer or installer to wire OUTSIDE of the "agricultural use" areas. It is possible to have an agricultural building with multiple uses. An example would be a large barn with horse pens, a feed room, a tack room, and a caretaker's apartment. Each "use" may be addressed separately. The livestock areas would be considered the most restrictive, since the area contains animal wastes, high moisture, and dusts generated by livestock feed. This area would be required to meet all of the above requirements. Concealing the wiring within a wall or ceiling cavity around the livestock pen does not minimize of the hazards associated with this area. The feed storage and tack rooms within our hypothetical barn would only need to address the spread of fine particulates that could cause an electrical fire. This area may be wired to minimize the dust hazard only. The caretaker's apartment, which under the construction codes adopted by the Douglas County, would be a separate "use" of "occupancy". So in addition to the building code requirements, a full separation between the living area and the barn would minimize the spread of corrosive vapors, moisture, and dusts allowing this area to be wired to meet the conventional requirements of the 2002 NEC.

Please consult with the Douglas County Building Division regarding ANY alternate wiring options at the time of submittal, or prior to approval, so that this information may be noted on your approved plans.



Metal agricultural barn, with storage area and livestock pens. Like most buildings, this structure can be divided by its uses and degree of hazards.



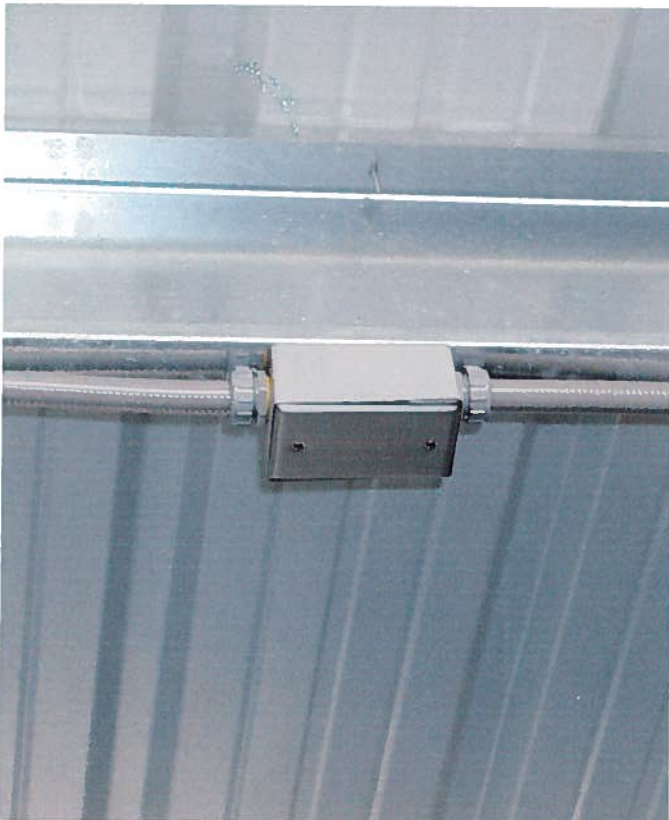
Close up view of weather & dust-proof light fixture, with guard.



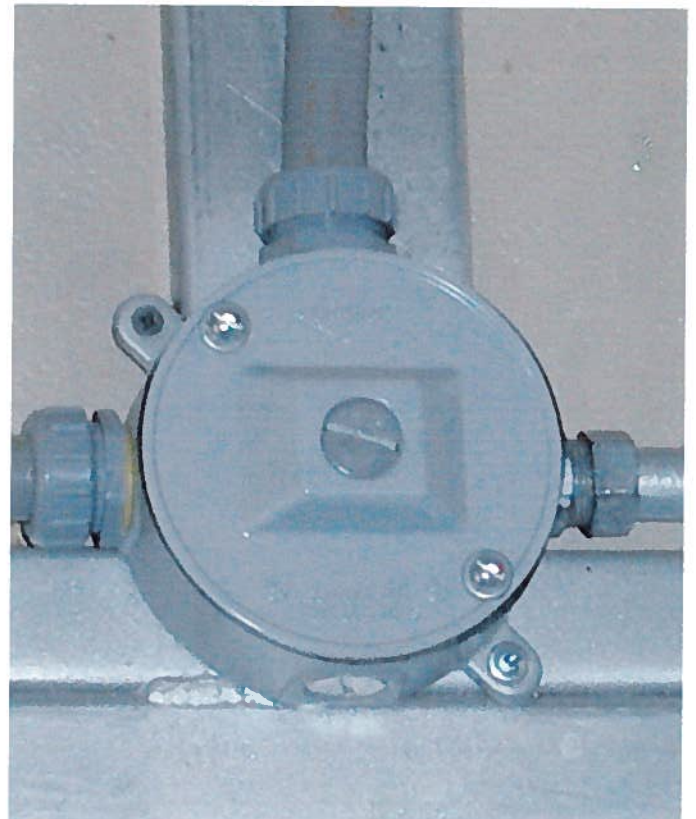
**Totally enclosed light fixture over livestock pen.
Note: non-metallic conduit used.**



**In storage area, the use of EMT is allowed since this
is a dust hazard area only.**



**An exterior "Bell" type fixture box used as a
J-Box.**



Weather & dust proof junction box